REMARKS

The applicant would like to thank the Examiner for the courtesy of a telephone interview conducted on July 14, 2004. During the interview, the patentability of claims 1, 9, 20 and 21 were discussed in view of U.S. Patent 5,990,904 to Griffin and the Federal Circuit's holding in *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d. 870 (69 U.S.PQ.2d 1865). The objections to the drawings were also discussed in view of 37 C.F.R. § 1.81. No agreement was reached on either the patentability of the claims or on the merits of the Examiner's objections to the claims or drawings.

In the office action of May 17, 2004, claims 1, 6, 9, 22, 26, 29 and 42 were rejected under 35 U.S.C. § 112, ¶ 1 for allegedly failing to satisfy the written description requirement. Claims 14, 19, 22-25, 34, 39 and 42-45 were deemed allowable, but were objected to as dependent upon rejected base claims. Claims 1-12, 16-17, 26-33 and 36-37 were rejected under 35 U.S.C. § 103(a) as obvious in view of Griffin and U.S. Patent 5,809,210 to Pearce. Claims 13, 15, 18, 20, 35, 38 and 40 were rejected under 35 U.S.C § 103(a) as obvious in view of Griffin, Pearce, and U.S. Patent 6,426,755 to Deering. Claims 21 and 41 were rejected under 35 U.S.C § 103(a) as obvious in view of Griffin, Pearce, Deering and the Foley textbook (Computer Graphics: Principles and Practice).

Claims 1-5 have been cancelled without prejudice. Claims 6, 9-11, 13-16, 18, 20-22, 26, 29-31, 33-36, 38 and 40-42 have been amended. Claims 6-45 are pending in the application. The applicant requests continued examination and allowance of claims 6-45 in view of the following remarks.

OBJECTIONS TO THE DRAWINGS

In the office action of May 17, 2004, the Examiner objected to the drawings under 37 C.F.R. § 1.83(a) for allegedly failing to show every feature of the claimed invention including the features of anti-aliasing, motion-blurring, and depth-of-field blurring images as they are

composited. The applicant respectfully submits that the drawings currently show all necessary features of the claimed invention.

Patent drawings are only required "where necessary for the understanding of the subject matter sought to be patented." 37 C.F.R. § 1.81(a). When the subject matter sought to be patented is a method or process, the types of drawings needed to facilitate an understanding of the invention can be in the form of flow sheets and diagrammatic views. *See* 37 C.F.R. 1.81(b). In the instant application, figure 6 is a flow-chart depicting one embodiment of the applicant's method for resolving a motion buffer. *See, e.g.,* Application, p. 13, ll. 6-7. When motion buffers are resolved according to the embodiment disclosed in figure 6, any scan-converted 3-D objects that are stored in the motion buffer are properly anti-aliased, depth-of-field blurred and motion blurred. Therefore, the applicant respectfully submits that no additional drawings are needed to show these features of the claimed invention.

OBJECTIONS AND REJECTIONS UNDER 35 U.S.C. § 112, ¶ 1

In the office action of May 17, 2004, the Examiner rejected claims 6, 9, 22, 26, 29 and 42 under 35 U.S.C. § 112, ¶ 1 as allegedly failing the written description requirement, and under 37 C.F.R.§ 1.75(d) as allegedly failing to distinctly claim the invention. In particular, the Examiner rejected the claims because they can allegedly be interpreted in more than one way. This suggests the Examiner intended to reject the claims as indefinite under 35 U.S.C. § 112, ¶ 2 rather than as lacking written description. The applicant has amended claims 6, 9, 22, 26, 29 and 42, and respectfully submits that the claims, as amended, are definite as a matter of law.

Claims 6 and 26, as amended, respectively recite a method and apparatus for creating a motion buffer, comprising scan-converting a 3-D object's primitives into a plurality of pixel fragments "wherein each pixel fragment is configured to store the local properties of a scan-converted object primitive including the object primitive's local color, depth, coverage, transfer mode, and at least one of the object primitive's rate of change of depth or surface geometry information." Claims 9 and 22, as amended, respectively recite a method and apparatus for compositing one or more scan-converted 3-D objects comprising receiving a motion buffer

containing "each scan-converted 3-D object's color, depth, coverage, transfer mode, and at least one of each scan-converted 3-D object's rate of change of depth or surface geometry information." Claims 22 and 42, as amended, respectively recite a method and apparatus for rendering a plurality of scan-converted 3-D objects comprising rendering all non-simple and non-interacting object clusters to a motion buffer containing "each scan-converted 3-D object's color, depth, coverage, transfer mode, and at least one of each scan-converted 3-D object's rate of change of depth or surface geometry information."

In *SuperGuide Corp. v. DirecTV Enters., Inc.*, the Federal Circuit found a patentee could claim a list of items to be stored as a disjunctive list that uses 'or' instead of 'and', despite language in the MPEP that use of the word 'or' renders claims indefinite, because "the use of the phrase 'at least one of' provides definiteness that is not present in the example provided in the MPEP rule." 358 F.3d. 870, 887 (69 U.S.PQ.2d 1865). As amended, claims 6 and 9 recite storing each object primitive's "color, depth, coverage, transfer mode, and at least one of the object primitive's rate of change of depth or surface geometry information," while claims 22, 26, 29 and 42 recite storing each scan-converted 3-D object's "color, depth, coverage, transfer mode and at least one of each scan-converted 3-D object's rate of change of depth or surface geometry information." Given the controlling precedent established by the Federal Circuit's decision in *SuperGuide,* the applicant respectfully submits that the phrase "at least one of" renders definite claims 6, 9, 22, 26, 29 and 42, and requires storing each object primitive or scan-converted 3-D object's color, depth, coverage, transfer mode AND at least one element taken from the disjunctive list: rate of change of depth OR surface geometry information. Consequently, the applicant respectfully submits that claims 6, 9, 22, 26, 29 and 42 satisfy the written description and definiteness requirements of 35 U.S.C. § 112.

RESPONSE TO REJECTIONS UNDER 103(a)

In the office action of May 17, 2004, the Examiner rejected claims 6-12, 16-17, 26-33 and 36-37 as obvious in view of Griffin and Pearce, rejected claims 13, 15, 18, 20, 35, 38 and 40 as obvious in view of Griffin, Pearce, and Deering, and rejected claims 21 and 41 as obvious in

view of Griffin, Pearce, Deering and Foley. The applicant respectfully submits that amended claims 6-45 are patentable over any combination of these references for the following reason.

For each of the rejected claims, the Examiner relies on Griffin's description of his texture filter engine 400 to meet the limitation of making or using a data structure that is configured to store a scan-converted 3-D objects color, depth, coverage, transfer mode, and "rate change of depth or surface geometry information." Yet Griffin's texture filter engine 400 merely discloses "calculat[ing] pixel color and alpha data for polygons that *are being rendered*." Griffin at col. 18, ll. 50-51. Thus, while Griffin's texture filter engine 400 uses the Z-slope information from a 3-D vector object to actively render that object into a pixel buffer (e.g., by calculating and storing color and alpha values for the pixels into which the object *is rendered*), it does not store in the pixel buffer the "rate of change of depth or surface geometry information" of the 3-D objects that *have been rendered*, or later use that information to resolve the pixel buffer to achieve various image processing effects.

Reading Griffin as a whole, it is obvious that the reference fails to disclose rendering or scan-converting 3-D objects into pixel fragments that are configured to store each scan-converted 3-D object's "color, depth, coverage, transfer mode, and at least one of each scan-converted 3-D object's rate of change of depth or surface geometry information" as recited in claims 6, 9, 22, 26, 29 and 42. Instead, Griffin teaches no more than storing each scan-converted 3-D object's color, depth, coverage and transfer mode information.

The following list demonstrates how the Griffin reference consistently and repeatedly only ever discloses storing a scan-converted object's color, depth, coverage and transfer mode information in his pixel or fragment buffers:

- In the abstract, Griffin discloses that rasterizing scene to create "*pixel fragments having color, depth, and coverage* [that] are stored in a fragment buffer." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in the pixel fragments.
- At col. 5, ll. 13-23, Griffin discloses generating "pixel data, including *color, depth, and coverage data,*" and storing in a pixel buffer "*color and depth*

data for fully covered pixels," while storing in a fragment buffer *"color, depth, and coverage data* for partially covered pixels." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in either the pixel or fragment buffers.

- At col. 19, ll. 21-29, Griffin discloses storing in a pixel buffer "eight bits per *color* component (R G B), eight bits for the *alpha* component, 24 bits for the *Z-buffer*, 8 bits for the *stencil buffer*, and a nine bit pointer into the fragment buffer." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in the pixel buffer.
- At col. 19, ll. 44-45, Griffin discloses storing in a fragment buffer "*the same data* as in the pixel buffer entries *plus a 4 x 4 mask.*" (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in the fragment buffer.
- At col. 30, ll. 7-15, Griffin discloses a pixel buffer that stores "*color, alpha and depth data*" and a fragment buffer that stores "*fragment data* to represent *partial coverage* of a pixel." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in either the pixel or fragment buffers.
- At col. 34, ll. 8-17, Griffin discloses a pixel buffer that stores "R | G | B | α | Z | P where R, G, B are the red, green, and blue *color* components respectively, α is the alpha component which represents the *translucency* of the pixel, and Z is the Z component which represents the *depth.*" (emphasis added). P is a pointer into the fragment buffer. Griffin fails to disclose storing surface geometry or rate of change of depth information in the pixel buffer.
- At col. 34, ll. 35-37, Griffin discloses a fragment buffer that stores "*color, α, Z and coverage data* associated with [a] surface." (emphasis added). Griffin fails to disclose storing in the fragment buffer the surface geometry or rate of change of depth information associated with the surface.

- At col. 34, ll. 46-59, Griffin discloses a fragment buffer that stores "R | G | B | α | Z | M | P | S where R, G, B are the red, green, and blue *color* components respectively, α is the alpha value which represents the *translucency* of the pixel, and Z is the Z-value which represents the *depth* of the pixel from the eye point, M is a 4 x 4 pixel *coverage* bitmask for each pixel which is partially covered, P is a pointer to the next fragment buffer entry, and S is used to represent a fragment stencil." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in the fragment buffer.
- At col. 35, ll. 53-57, Griffin discloses a pixel buffer that stores "*color, and depth* (Z) . . . [and] a pointer to a fragment list, including *fragments* that *have a coverage mask* that is not fully covered, *or have an alpha* that is not fully opaque." (emphasis added). Griffin fails to disclose storing surface geometry or rate of change of depth information in the pixel or fragment buffers.
- At col. 36, ll. 26-30, Griffin discloses a process for merging fragments in the fragment buffer by creating new pixel data having "*color, Z, and coverage* mask (968) for a pixel location." Griffin fails to disclose creating pixel or fragment data having surface geometry or rate of change of depth information, or storing that information in a pixel or fragment buffer.
- At col. 41, ll. 63-65, Griffin discloses resolving a pixel fragment buffer by accumulating pixel fragments having "*depth, color, and coverage* only," or alternatively by accumulating fragments having "*depth, color, coverage and alpha*." Id. at col. 42, ll. 28-30, ll. 46-47. Griffin fails to disclose resolving a pixel fragment buffer in which surface geometry or rate of change of depth information is stored.

In sum, the only information from a scan-converted 3-D object that Griffin consistently and repeatedly discloses storing in a pixel or fragment buffer is the scan-converted 3-D object's

color, depth, coverage, and transfer mode information. Griffin fails to disclose or even suggest storing at least one of the scan-converted 3-D object's "rate of change of depth or surface geometry information" in a pixel or fragment buffer, or using that information to later resolve the pixel or fragment buffer to composite the scan-converted 3-D object to a 2-D scene. Since claims 6-45 recite creating or using a pixel fragment buffer or motion buffer in which each scan-converted 3-D object's "color, depth, coverage, transfer mode and at least one of each scan-converted object's rate of change of depth or surface geometry information" is stored, and since Griffin taken alone or in combination with any of Pearce, Deering or Foley fails to disclose this limitation, the applicant respectfully submits that claims 6-45 are patentable over Griffin, Pearce, Deering or Foley, whether each reference is taken alone or in any combination.

REQUEST TO CONSIDER REFERENCES CITED IN IDS OF OCTOBER 3, 2002

In the response filed on March 24, 2004, the applicant requested consideration of the references cited in an IDS filed on October 3, 2002. In the office action of May 17, 2004, the Examiner indicated the only IDS of record was dated July 31, 2002. Enclosed, please find a copy of the IDS that was filed on October 3, 2002 together with a stamped postcard evidencing its receipt by the Patent Office on October 8, 2002. The applicant respectfully requests consideration of the claims in view of the references cited in the IDS.

All claims are believed to be in condition for allowance, which action is kindly requested. Enclosed, please find a $110 check for the Petition for Extension of Time fee. Please apply any other applicable charges or credits to deposit account 06-1050.

Respectfully submitted,

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